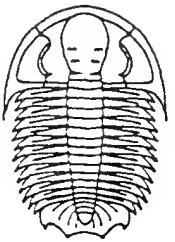
THE FOSSIL COLLECTOR

BULLETIN Nº19 JUNE 1986



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Published by
THE FOSSIL COLLECTORS ASSOCIATION OF AUSTRALASIA

EDITORIAL

After the mammoth article on graptolites in the last issue, I guess it's only fair that our vertebrate enthusiasts be given full consideration in this current edition of "The Fossil Collector"

To be truthful, chance plays a very large part in what is available for publication at any given time. It just so happened that over the last four months, not only had we received two articles on Thylacoleo from John Barrie and one on recent fossil fish discoveries in Queensland from Sue Turner, but everything that seemed to appear in the press and magazines we see from time to time, related to vertebrate palaeontology. To add to the continuing sagas of Dinosaur Cove and Riversleigh we had the Labyrinthodont discoveries in Sydney - see David Morley's article on page 7

It is almost enough to make an "invertebrate editor" (that doesn't mean he has no backbone!) go into hibernation until someone comes up with a decent article about some new echinoid or trilobite find etc.

All this leads up to the fact that next January's Bulletin will be our 21st; an event we hope can be marked by a special issue with as many original articles as can be obtained. While we still have No.20 to consider, all of you should start thinking about sources of material that could help make this a true anniversary edition - it's only a little over 6 months away.

Frank Holmes

F.C.A.A. MEETING EASTER 1986

A meeting of F.C.A.A. members and prospective members was held at the Gemboree at Loxton, South Australia on Sunday 30th March, 1986. John Barrie, one of the Association's South Australian representatives acted as Chairman.

Twenty three members and eighteen prospective members were present. Apologies were received from another eleven members.

In spite of an official welcome from Mr. Murray Edwards, Chairman of the Gemboree Committee, the meeting was disrupted due to the venue being required for another group only one hour after the scheduled starting time. After a short resumption in the grandstand, the meeting was again adjourned, to continue as an informal open-air gathering at the Barrie's campsite. (The disruption of F.C.A.A. meetings at Gemborees is now considered mandatory! - perhaps a private venue should be considered. Ed.)

Items discussed and referred to the Secretary for consideration and action include :-

(1) The need for a badge or some other type of official identification to be available to members.

(2) Whether the F.C.A.A. should become an "Incorporated Association" under a State Act particularly to limit its legal liability (if any).

(3) The need for the F.C.A.A. to draw up and adopt a suitable Constitution and Rules. This of course is a prerequisite to becoming "Incorporated".

(4) A letter be sent to the Gemboree Committee complaining about the lack of thought given to the selection of a venue for the F.C.A.A.'s one and only meeting a year.

(5) That an index of articles published in Bulletins 1 - 20 be published with our 21st issue due out in January 1987.

Secretary's Note - The above matters are currently being investigated with a view to sending a questionnaire to all members with the next Bulletin.

F.C.A.A. INDEPENDENCE

There appears to be a misconception among some members that the F.C.A.A., is affiliated with the Australian Federation of Lapidary & Allied Crafts Association (A.F.L.A.C.A.). This is not the case. While maintaining a very cordial relationship with this body and assisting wherever possible in the area of fossil judging and rules, we are not in any way affiliated.

OVERSEAS MEMBER WISHING TO TRADE

Fred Lindberg, 136 South Washington, Casper, Wyoming 82601, U.S.A., would like to exchange Green River fossil fish, White River mammal material and ammonites for fossil material from other countries.

Fred would be pleased to trade by mail and also hopes to be in Australia during July and August, 1986 to trade in person.

DONATIONS

The Secretary wishes to thank Dot. Morgan from Maroubra,N.S.W., Beryl Whitney from Lindfield, N.S.W., and Emmett Wallace from Texas, U.S.A., for their donations to the F.C.A.A.

As with previous donations, these will be used to sponsor professional palaeontological expeditions and research projects etc., in the future.

FINANCES

Income and Expenditure for the Financial Year, 1st March, 1985 to 28th February, 1986.

INCOME		EXPENDITURE	
Subscriptions		Postage	445.12
- current	594.47	Printing	290.04
- Advance	368.00	Photocopies, photos & photo screening	156.40
- Overpaid	16.00	Stationery	118.79
Donations	32.41	Sundries	34.50
Advertising	-	State Rep. expenses	7.10
Bank Interest	30.46	Sub'n. to FOGAMM	20.00
Sale of Bulletins	121.65	Donations	150.00
Sale of Car Stickers	10.50	State/Fed. Tax	2.81
		Bank charges	-
		Refunds	16.00
Total	$1,173.49	Total	$1,240.76

Balance 28th February, 1986

Brought forward from	1984/85	926.67
Add income	1985/86	1,173.49
		2,100.16
Less expenditure	1985/86	1,240.76
		$ 859.40

Although the above figures show a small deficit for the financial year, when advance subscriptions are omitted and current subscriptions are adjusted to include those paid in the previous year (541.00), income in fact exceeded expenditure by approximately $180.00.

Membership at 28th February, 1986 stood at 185 of which 13 were overseas members.

THE DE VIS SYMPOSIUM

"Problems in Vertebrate Biology and Phylogeny - An Australian Perspective"

A Symposium on Vertebrate Palaeontology and Allied Sciences

BRISBANE MAY 12th to MAY 14th, 1987.

Symposium on Vertebrate Palaeontology and Allied Sciences is to be held in Brisbane from May 12th to May 14th, 1987. The proceedings will be held in the lecture theatre at the new Queensland Museum.

This three day symposium will be dedicated to Charles Walter De Vis (1829-1915), who was the first Director of the Queensland Museum and who laid the foundations for much of the subsequent progress of Vertebrate Palaeontology in Australia. In his time De Vis undertook pioneering work on a variety of Australia's ancient vertebrate animals, including fishes, reptiles, birds and mammals.

The symposium will be a forum for original contributions to the history of the Australian vertebrate fauna and will provide a workshop environment to promote collaborative and/or interdisciplinary research. It is intended to accommodate papers in vertebrate palaeontology and in the allied fields of....

> palaeobiology, evolutionary biology, developmental biology, comparative anatomy, functional anatomy, biostratigraphy, taphonomy, palaeoichnology and palaeoecology...

insofar as these bear on the ancient vertebrate animals of Australia.

The symposium will be sponsored jointly by The Queensland Museum and The Royal Society of Queensland.

In addition it is planned to arrange visits to three well known localities for fossil vertebrates in Queensland.

The registration fee Aus.$45.00 (students A$25.00) covers all incidentals for the three days, such as morning and afternoon refreshments, collected abstracts and a copy of the published proceedings.

Deadline for Registration : JANUARY 31ST, 1987.

Anyone who envisages presenting a paper or just attending, should write to either Dr. Tony Thulborn or Dr. Susan Turner requesting a copy of the "Second Circular" which includes information about accommodation and field trips.

Dr. Tony Thulborn,
Dept., of Zoology,
University of Queensland,
St. Lucia,
Queensland, 4067.
Australia.

Dr. Susan Turner,
The Queensland Museum,
Gregory Terrace,
Fortitude Valley,
Queensland, 4006.
Australia.

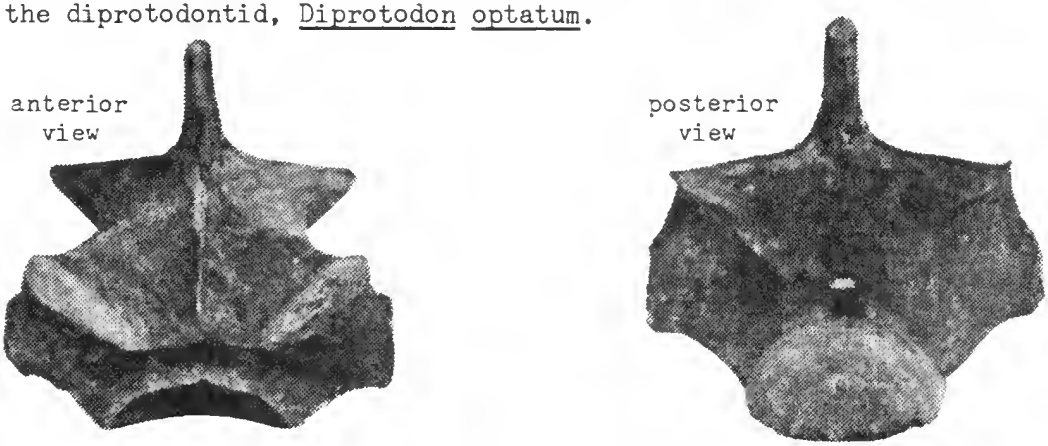
Proceedings of the symposium will be published as a special volume in the Memoirs series of the Queensland Museum.

MEGALANIA FINDS

Recent digging in Pleistocene fluviatile deposits on the Darling Downs by members of the F.C.A.A., has unearthed two vertebrae of the giant varanid lizard Megalania prisca (Owen).

Fossils of Megalania, the largest of the known terrestrial lizards, are rare in these deposits, being known only from isolated bones and teeth and parts of one very incomplete skeleton. Comparison of these parts with those of the living Komodo dragon (Varanus komodoensis) has inferred a lizard with a maximum body length of 5 metres plus a tail of 2.5 metres and a weight near 620 kg. Absence of large lion sized predators during the Australian Pleistocene probably allowed Megalania to fill this niche and become one of the dominant predators.

Modern Komodo dragons are quite capable of successfully preying on animals such as deer and buffaloes. With Megalania being twice the size of its largest relative, it seems likely that it was easily capable of killing our largest herbivorous marsupial, the diprotodontid, Diprotodon optatum.



MEGALANIA VERTEBRA x 0·5

AUSTRALIA'S FOURTH FOSSIL KING CRAB

Soon after publishing our last Bulletin we learnt from Dr. John Pickett, that the Devonian horseshoe crab found last year in the Bumberry Range east of Parkes, New South Wales, is safely in the Australian Museum collections, thanks to the many individuals and groups (including the F.C.A.A.) who made donations towards the purchase.

It is a member of the superfamily Belinuroidea, with articulated opisthosomal segments, not a limuloid with fused segments.

N.S.W. AMPHIBIAN FIND AT LONG REEF ? by David Morley

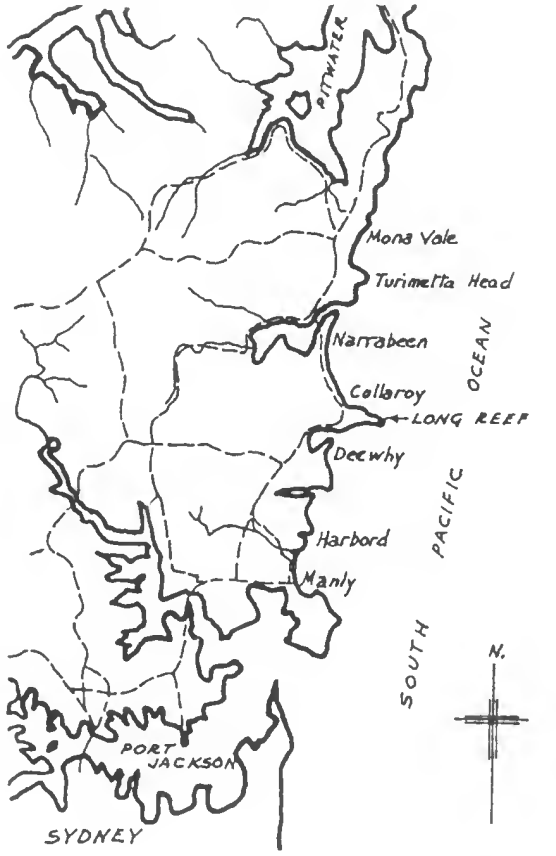
Long Reef is a headland of Triassic bedrock with cliffs and extensive rock platforms connected to the mainland by Quaternary sand deposits (called a tombolo). It is situated approx.17 kms N.E. of Sydney.

With the exception of a raised section about 150 m off shore, most of the rock platform is covered at high tide. However, at low tide an almost continuous rock platform is revealed extending about 1.8 kms around the headland and about 260 m off the point.

Long Reef has been made a Protected Marine Reserve due to the great variety of intertidal fauna found there today.

The discovery of bones on the reef by the President of the N.S.W. Fossil Club, Colin Chidley, was reported to Dr. Alex Ritchie, head of the Earth Sciences Division at the Australian Museum, Sydney. Subsequently Bob Jones, the museum's Collections Manager, and his son, using the information given to them, not only located the original find but nearby another new and more accessible group of bones.

Locality Map of coast line north of Sydney



Because of the vulnerability of this latter discovery, museum staff, assisted by volunteers from the Fossil Club of N.S.W., excavated the second group of bones at low tide on Saturday March 22nd. 1986.

Several holes were drilled around the specimens and because of the proximity of a small shelf, removal of a slab approx. 300mm x 450mm was made without difficulty. According to Bob Jones the area left exposed would soon erode and be covered by algae to again become an unnoticeable part of the reef.

Cont...

N.S.W. AMPHIBIAN FIND AT LONG REEF (Cont.)

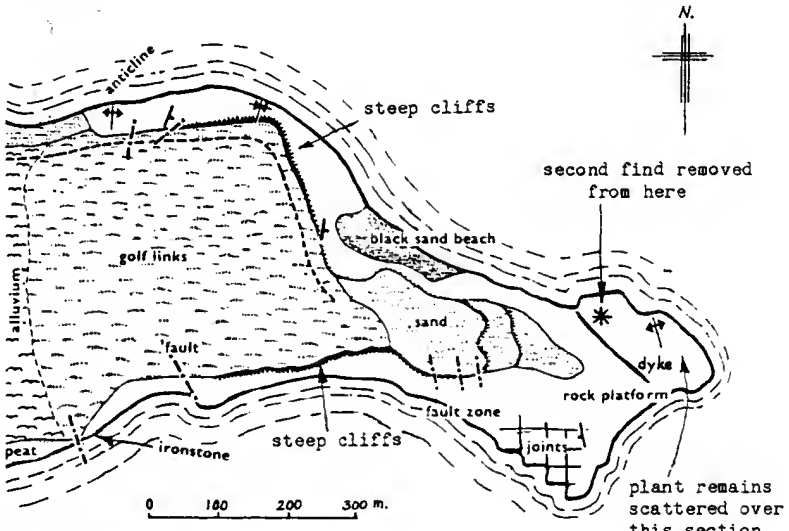
The rock platform from which the bones were removed is composed of grey siltstone belonging to the Narrabeen Group (Clifton Sub Group) known locally as the Collaroy Claystones. This group covers the major part of the Sydney Basin, lying between the Illawarra Coal Measures (below) and the Hawkesbury Sandstone (above). The Collaroy Claystones are the equivalent of the more widely known Bald Hill Claystones from the near South Coast District and are of Early Triassic (Scythian) age.

Despite the fact that during this period the Sydney area was approximately 65° south of the equator, the climate is believed to have been warm and humid with seasonal rainfalls.

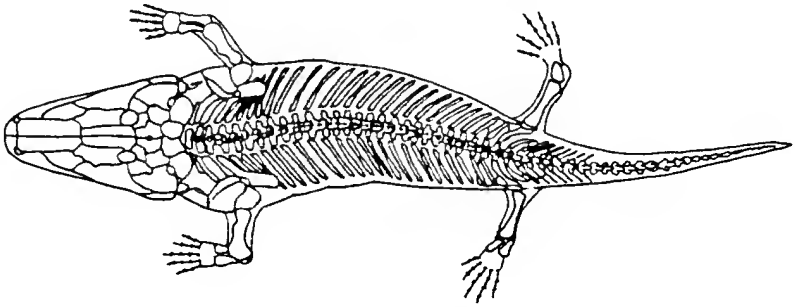
The Narrabeen Group sediments were laid down in a shallow fresh-water environment with temporary muddy lagoons confined by sand bars during unstable deltaic conditions. These sediments are of a grey-brown podzolic paleosol (fossil soil) from well drained country with current flows indicated from the north and north west.

According to Alex Ritchie and Bob Jones, the bones so far recovered are almost certainly amphibian and possibly from Paracyclotosaurus, a labyrinthodont. However, they cannot be positively identified until removed from the rock.

The slab removed from Long Reef contains several bone fragments and despite some weathering, fine detail such as grain structure is clearly visible. The fragments, although sometimes dark in



Locality map



Reconstruction of a 2.25m long labyrinthodont skeleton
from St Peters brickpit near Sydney (after Watson)

colour are easily distinguishable from the charcoal black plant remains also found on the shore platform.

The original bones discovered by Colin Chidley are to be removed from the platform at a later date as they are less vulnerable to erosion and being covered with algae are fairly inconspicuous. As they dip down into the bedrock they are also likely to be harder to remove.

This is not the first discovery of amphibians in this region. Previous finds include Blinasaurus wilkinsoni (about 10 cm long) and Parotosuchus wadei from the Early/lower Middle Triassic, Gosford Group; Parotosuchus brookvalensis and ?Mastodonsaurus (about 2m long) from the lower Middle Triassic Hawkesbury Sandstone; and Notobrachyops picketti and Paracyclotosaurus davidi from the Middle Triassic, Wianamatta Group.

Fossil amphibian footprints have also been found around Sydney, but positive identification of these is difficult.

The labyrinthodonts first emerged in the late Devonian and are considered to be descended from rhipidistian air-breathing fish. As a group they reached their peak in the Triassic and until fairly recently were believed to have become extinct by the end of this period. However, the discovery of an almost complete labyrinthodont in the indisputably Jurassic Evergreen Formation of Queensland (Warren 1977), at least shows they survived into the Jurassic in Australia.

One of the most complete and well preserved specimens ever found is that of Paracyclotosaurus davidi, recovered from a brick pit at St. Peters in 1910 by Mr. B. Dunstan of the Geological Survey of N.S.W. Subsequently it was transported to London where it is now in the British Museum of Natural History.

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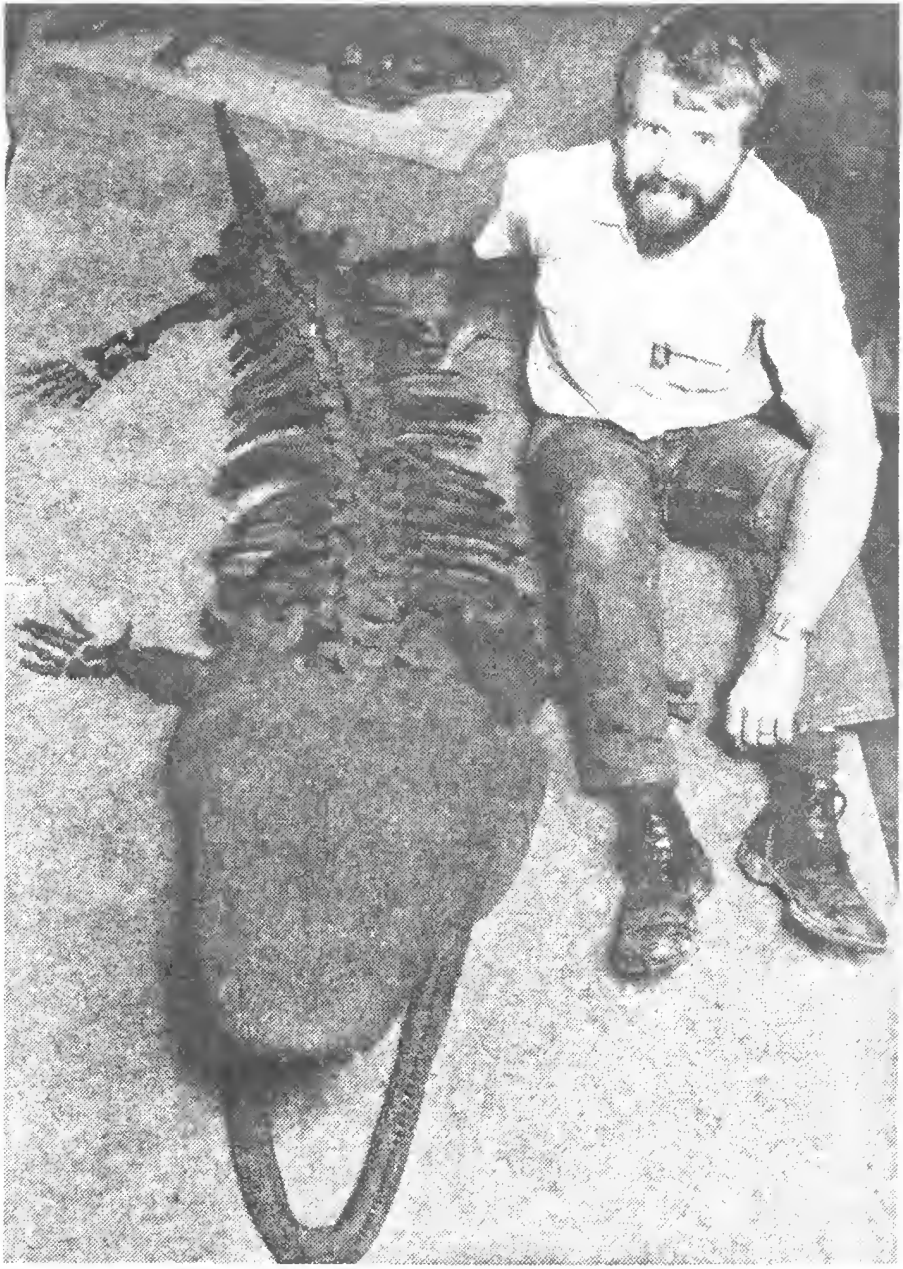
N.S.W AMPHIBIAN FIND AT LONG REEF (Cont.)



Bob Jones with a replica of *Paracyclotosaurus davidi* on display at the Australian Museum.

Preservation was so perfect that it was possible to trace nerve structures on the inside of the skull and also show that not only did the animal have scaly skin, but that the skin was puckered, inferring a degree of flexibility. In addition, evidence suggests the skin was dry, which together with its expanded thoracic ribs indicates that P. davidi, unlike other amphibians, which use their skin in gas exchange, had developed a lung mechanism similar to reptiles.

The description of P. davidi (Watson 1958) includes speculation that the animal may have been killed by a tree limb falling on it as is evidenced by the cracked and displaced bones in the skull. It would then have been washed into a lagoon and quickly buried by accumulating silts, thus preserving the complete skeleton we have today.

Watson also suggests that the 2.25 m long animal would have weighed more than a large man and had a stride of about 20 cms and a track of about 80 cms.

Acknowledgements

The author wishes to thank Bob Jones, Collections Manager, Australian Museum, Sydney for his assistance and the Manley Daily, for permission to use the photograph on page 10.

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THE ARCHAEOPTERYX AFFAIR

Early last year, astronomer Sir Fred Hoyle and some physicist colleagues suggested that Archaeopteryx, the reptilian-looking fossil bird from the Jurassic Solnhofen limestone, was a 19th Century fake, perpetrated by a Bavarian, Dr. Karl Haberline.

The driving force behind the forgery allegation, an Israeli consultant in electronic systems, Lee Spetner, believed that Haberlein gouged out an area around two genuine fossils of a dinosaur like reptile, made a matrix with cement which he applied to the fossils and then pressed chicken or similar feathers into the mixture to create feather impressions.

Photos taken of the specimen, housed in the Natural History Museum in London were deemed by these "experts" to show signs of the forger's work.

Needless to say, palaeontologists were not impressed with these claims and strongly refuted the idea that the London and Berlin specimens of Archaeopteryx were fakes.

Now, scientists from the Natural History Museum have published in "Science", the results of a detailed examination of their specimens. They found no traces of the "cement" supposed to have been used to stick feathers to the bones, in fact photographs taken under ultraviolet light revealed fine lines and minute inorganic projections of manganese dioxide that ran across the alleged "false" feathers into the genuine skeleton and tail. The pattern of these cracks and projections match others on the opposite slab of the split fossil. Alan Charig, a chief curator at the museum, states that these matching details would have been technically impossible to forge.

The most interesting point to the dispute is the concentration on the London and Berlin specimens as supposed fakes, while ignoring the fact that although the first described specimen emerged in 1855, feathered fossils had been coming out of the Solnhofen limestone since the 1820's. More specimens came to light in the 1860's and 70's followed by yet more in the 1950's. As a "New Scientist" report concluded: One would have to accept persistent fakers, handing down the skills of their cottage industry, generation by generation to support Darwin's theory of evolution - even before it was conceived.

References

New Scientist 14th March and 1st August, 1985
The Age, Melbourne 26th May, 1986.

FOSSIL SKULL FROM DINOSAUR COVE

The Melbourne Age, in an article titled "Dinosaur Cove yields a clue to solving a mammal mystery" reported the discovery a few weeks ago of an intact fossilised animal skull, almost certainly that of a fish.

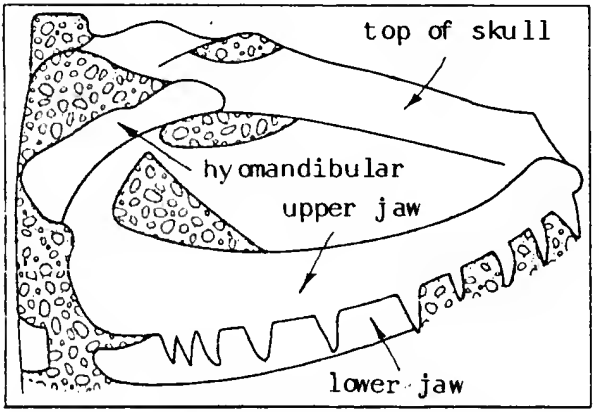
Leslie Kool, an F.C.A.A., member working for the Museum of Victoria, discovered the skull while cutting a block of sandstone, one of the tonnes of pieces brought to Melbourne from Dinosaur Cove near Cape Otway, where, teams acting for the museum and Monash University have conducted digs during the past three summers.

According to Dr. Tom Rich, Curator of Vertebrate Palaeontology at the museum, the fish skull is very important as it raises further hope that among the dinosaur and other prehistoric animal bones being found at Dinosaur Cove will be the remains of a mammal the same age as the fossil fish.

Such a find would be of world wide significance, as so far no one has been able to explain why Australian mammals developed in one direction and those elsewhere, in another.

Plans are already in train for a return to the site next summer, not to conduct the usual type of dig, but to mount a full scale mining operation. It is hoped that mining companies will provide help and advice in driving a tunnel into the cliff face above the mouth of the ancient river course which forms the fossil bed.

Extract from "Lahey at Large", The Age, Melbourne, 19th May, 1986.



Artist's impression of the 105 million years old fossil fish skull.

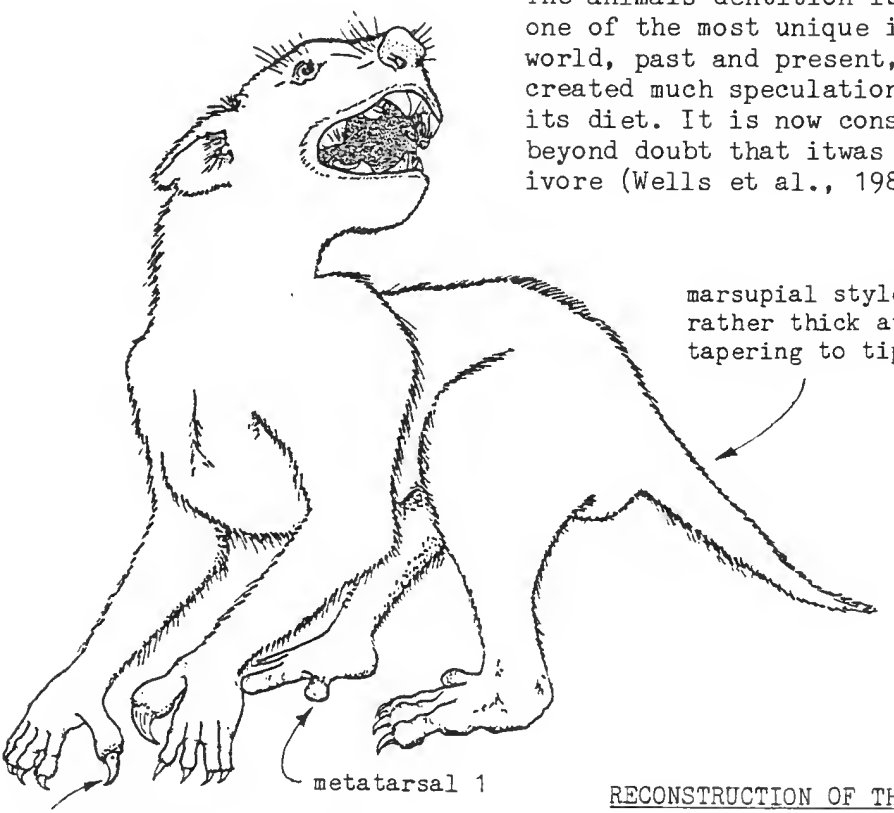
THE MARSUPIAL THYLACOLEO CARNIFEX OWEN by John Barrie

Thylacoleo has been described as the marsupial cave lion. Its remains are certainly found more often in caves such as those at Naracoorte in South Australia, than in the swamp deposits of Lancefield in Victoria, Bingara in N.S.W., and the area around Clifton in Queensland.

The animal was strongly built as is evidenced by the degree of sculpture on its bones. The pressure of muscles working against bone causes displacement and redeposition in areas of least pressure, thus creating ridges along the bone surface. These ridges maintain both the strength of the bone and the free action of the muscle. Conversely, slow moving or slightly built animals have rather rounded bones.

The fore-arms of Thylacoleo show particular evidence of strength, being quite long and ideally suited for climbing. The skull and jaws were also very robust with room for heavy muscular structure.

The animals dentition is arguably one of the most unique in the world, past and present, and has created much speculation as to its diet. It is now considered beyond doubt that itwas a carnivore (Wells et al., 1982).



RECONSTRUCTION OF THYLACOLEO CARNIFEX DRAWN BY JOHN BARRIE.

The dental formula as evidenced by specimens examined is as follows:-

$$I\frac{1.2.3.}{1.} \quad C\,\frac{1}{0} \quad Pm\,\frac{1.2.3.}{1.2.3.} \quad M\,\frac{1.2.}{1.2.}$$

The most spectacular teeth are the upper and lower third premolars (PM3's), which are large guillotine-like blades with concave surfaces.

Occlusion caused food to be drawn towards the centre of the teeth where it was sheared off with the keen serrate edge of the blades. The other major teeth are the first incisors (I1), both upper and lower which would have been used for piercing, holding and stabbing.

It is interesting to compare the relationship of upper and lower dentition. The skull is very broad and certainly lion like as is witnessed by Sir Richard Owen's given name. The mandibles do not fuse at the symphysis but form a hydraulic joint. The lower jaws are narrow and when closed fit high against the palate between the upper teeth, the lower PM3's resting inside the upper ones. Similarly, the lower incisors rest with their tips at the base of the upper incisors.

To effectively bite, Thylacoleo's, in using their PM3's which invariably show great evidence of wear, must roll the jaw sideways. To avoid dislocating the opposite side condyle, the hydraulic symphysis must flex and allow the lower front incisors to cross the upper incisors. This action allows the PM3's to occlude and effectively shear. On specimens from young animals a very sharp edge is present on these PM3's and the bite is near vertical. With maturity the shearing surface becomes more obtuse and the bite apparently developed some-what more horizontal.

It is of note that on crossing the paired incisors during occlusion of the left PM3's, the left upper incisor meets the right lower incisor (and vice versa) creating a notch in the lower I1 near the tip.

The manus and pes have been described in detail by Wells and Nichol 1977, but no complete articulated specimen of pes has yet been recovered, consequently areas of doubt still exist.

It is also interesting to note that several artists in reconstructuring the Thylacoleo choose to show a clawless metatarsal 1 on the pes. While agreeing with this assumption, proof is elusive. A bone that may well be metatarsal 1 was found in association with pes material, however, there is no clear articular point of attachment. With Phascolarctos (koala)

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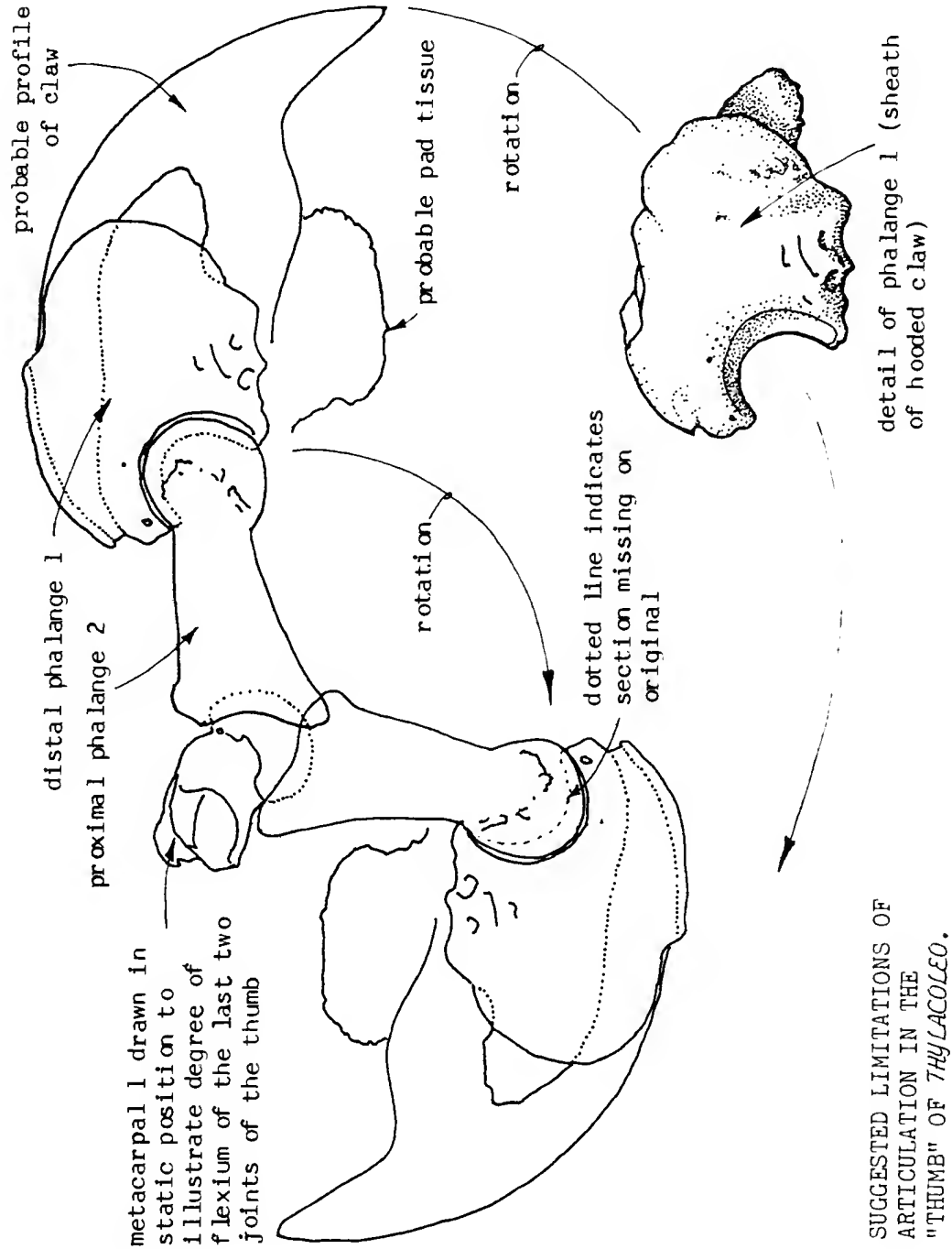
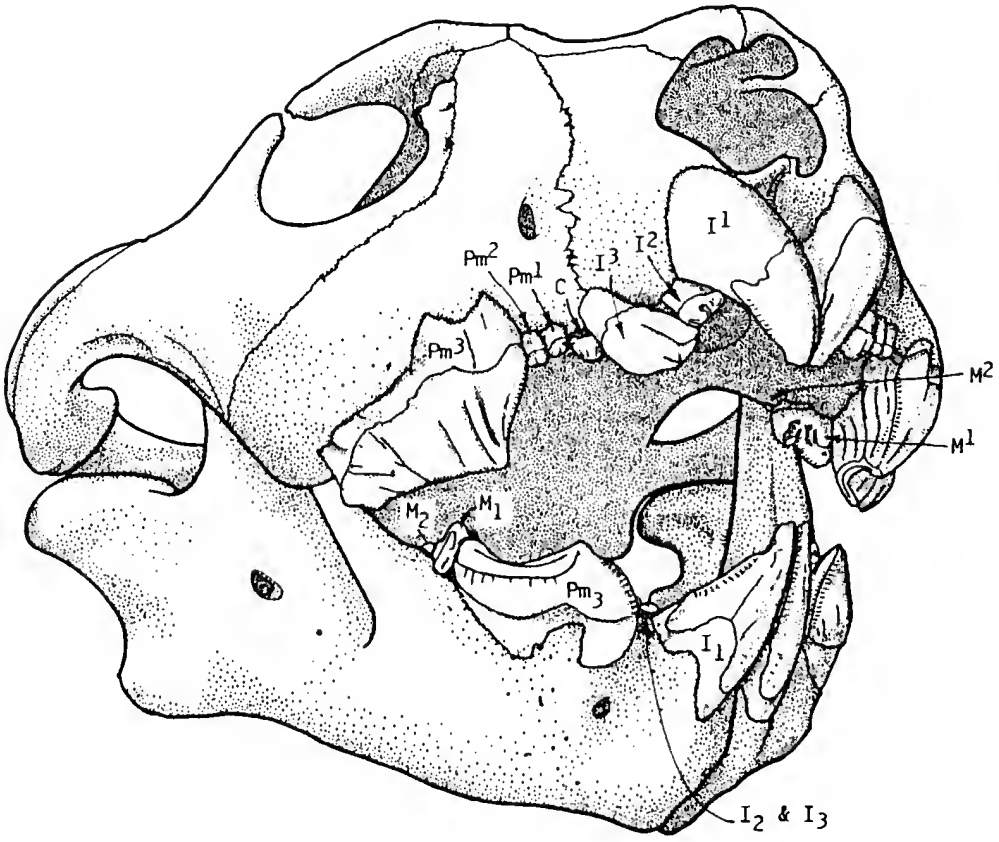
THE MARSUPIAL THYLACOLEO CARNIFEX OWEN (Cont.)



SUGGESTED LIMITATIONS OF ARTICULATION IN THE "THUMB" OF *THYLACOLEO*.

having a similar pes, it is suggested that the degree of articulation may be small, even if Thylacoleo was arboreal as is Phascolarctos. Consequently one would not expect the rounded surfaces to compare with the highly articulate clawed first phalange.

The hooded claws of both manus and pes are unusual. Studying the feet of cats, one finds retractable claws that literally fold back askew to rest between the digits, thus enabling cats to keep sharp claws from interfering with objects as they walk. Thylacoleo has a straight alignment along the bones to the distal phalanges and to avoid getting tangled up while walking must have had much less curvature on the claws. Generally claws



THYLACOLEO CARNIFEX OWEN (THYLACOLEONIDAE) x 0.65. Juvenile specimen of skull and jaws agape showing full dentation notations on right side except M^1 and M^2.

Cont...

THE MARSUPIAL THYLACOLEO CARNIFEX OWEN (Cont.)

are quite small judging by the distal phalange that supports them, although the thumb (distal phalange 1) is enormous by comparison. The syndactylous toes (generally used for grooming) are consistent with other syndactylids being rather more curved and slender.

The thumb has promoted great interest because of the size of the sheath housing the claw and the degree of articulation. In the manus, the thumb is supported from the scapholunar via the trapezium, metacarpal and proximal phalange to the distal phalange (hooded claw), the latter two bones being very diagnostic and highly articulate. The proximal end of the proximal phalange is trumpet shaped, fitting snugly against the blocky metacarpal while the distal end is highly rounded with a rather deep "V" providing a highly articulate joint in flexion but with great resistance to twisting. The thumb does not oppose the "index finger" as in humans, but the opposite side of the hand in the area of the pisiform (wrist). Wells and Nichol suggest that this would be the primary grasping movement. It may also be related to the manner in which Thylacoleo was able to run without the claw hindering its movement. This claw, no doubt, was an important element in Thylacoleo's hunting, its strength and mobility making it a formidable weapon. The purpose of the hood over the claw, particularly the thumb, is believed to be a mould from which the claw grows, and an anchor to give it tremendous support.

Studying the curvature lines inside the hood it is difficult to visualise the claw retracting within it. To do so it would need a fulcrum about which to rotate, yet the arcs evident on the inner surface of the hood indicate the fulcrum would be well below the digit. In addition, to be retractable it would need to act as a hydraulic ram although the hood does not appear to be strong enough, or the amount of travel available, sufficient to support and permit the effective use of such a sturdy claw.

Much research is still needed to try and unravel the mysteries of this, the largest known marsupial carnivore to live in Australia. With the ever increasing tempo of research on older fossil deposits, some of Thylacoleo's ancestors, such as Wakaleo, along with many strange creatures not previously known, are shedding much light on its evolution.

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HYPOTHESISING ON A TOOTH-MARKED BONE by John Barrie

During July, 1985, an excursion to Naracoorte in South Australia produced the proximal end of a Vombatus femur from amongst a few bones collected in the extreme upper levels of a cave deposit exposed by quarrying.

Marks on the bone indicate it had been subjected to a very aggressive chewing action which closer examination suggests may have been caused by Thylacoleo carnifex. In cross section the bone has been abraded deeply, leaving facets at approximately 60 degrees to each other. Comparisons were made by studying the marks on other bones, available literature (Horton & Wright 1981 and Wells, Horton and Rogers 1982) and, bones from King Creek on the Darling Downs and Naracoorte which show only opposing marks attributed to the cutting action of upper and lower P3.

By occluding a maxilla and mandible specimen, there appeared to be no way in which the bone could have been marked by the action of upper and lower P3 as shown on the comparative material.

Investigation of a mandible revealed that the angle formed between I1 and P3 is approximately 60 degrees. Placing the marked bone carefully between these teeth an incredible fit resulted.

The triangular shaped cross section of I1 is rather unusual in Thylacoleo, detailed examination disclosing a very definite and slightly serrated auxilliary ridge along the labial edge. Similarly the posterior edge of P3 has a ridge also serrated and somewhat opposing I1. The resulting contour develops a holding action similar to a bollard used in securing ropes on yachts.

The marks on the bones commence with a shallow scrape close to

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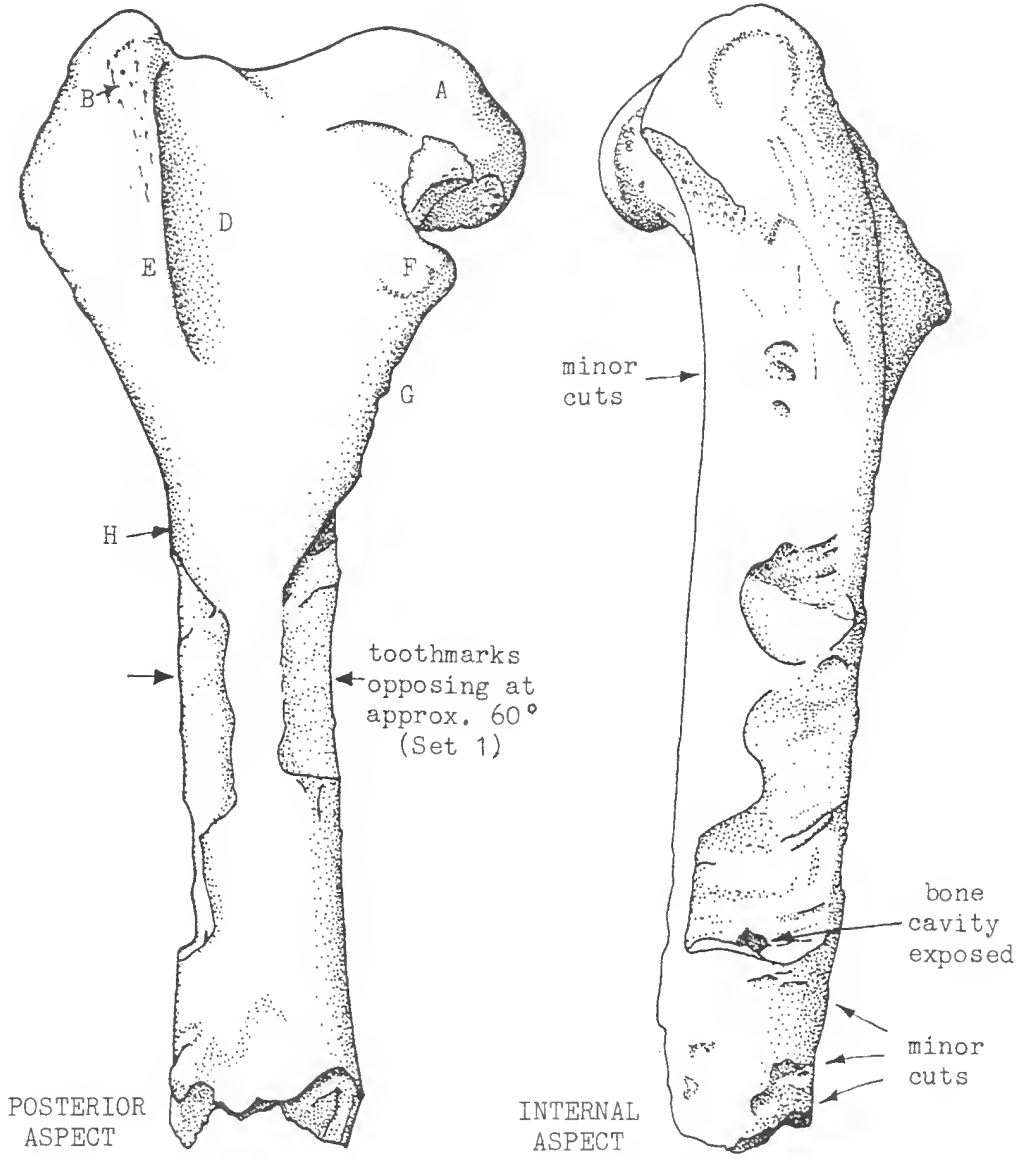
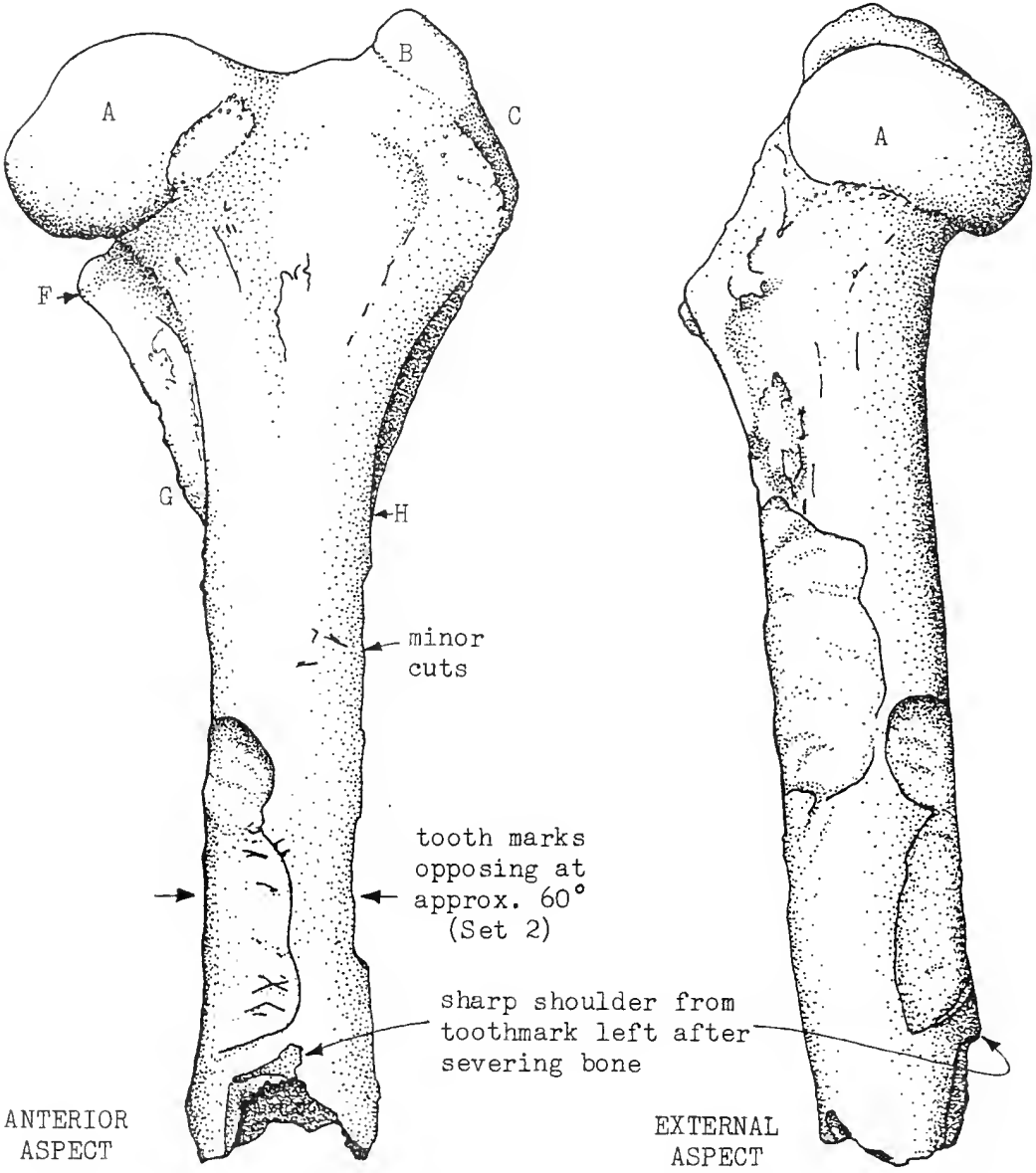
HYPOTHESISING ON A TOOTH-MARKED BONE (Cont.)

A. Head
B. Great trochanter
C. Epiphysial line of head
D. Trochanteric fossa



PROXIMAL END OF VOMBATUS LEFT FEMUR SHOWING TOOTH MARKS x 1·3

E. Posterior border of trochanteric fossa
F. Lesser trochanter
G. Ridge descending from lesser trochanter
H. Muscular insertional tract



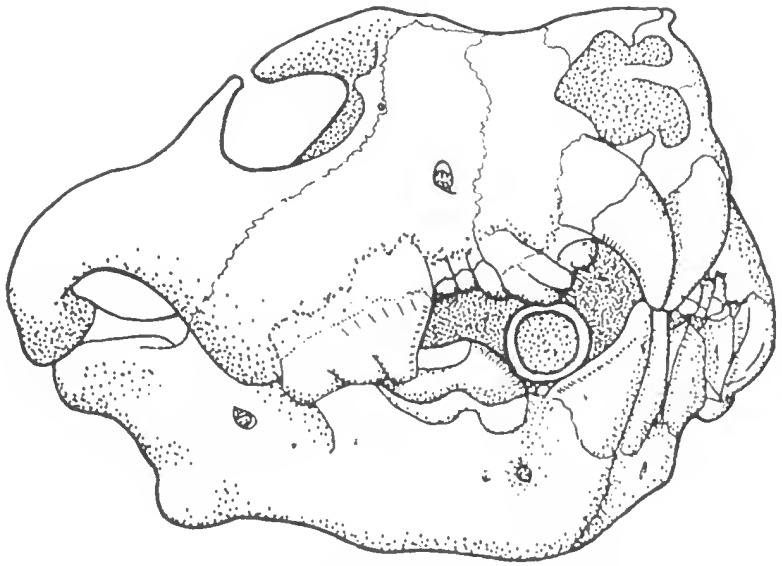
PROXIMAL END OF VOMBATUS LEFT FEMUR SHOWING TOOTH MARKS x 1·3

HYPOTHESISING ON A TOOTH-MARKED BONE (Cont.)

the swelling at the proximal end of the femur, then became 3 to 4 mm deep as they extend 20 mm along the shaft to end in a sharp angular edge. This process is repeated on the other side of the femur.

The second set of gouges penetrates the bone at the deepest point. 15 mm from the point at which the bone has been severed. Gashes, but no drawn out gouge marks are associated with the broken edge. This break does not appear to have been the result of a holding grip becoming too deeply incised. Maybe it was a method used by Thylacoleo to disable its prey. Each set of gouge marks is paired. One produced by I1 has a smooth slightly convex surface while the other produced by P3 has more irregular grooves some of which are individually concave. It has been established that both sets of marks were made by the left mandible indicating that the prey was dragged, both on its back and on its belly. Had both the left and right mandible been used the relationship of the marks would have been reversed.

The degree of marking on this bone infers a considerable effort was involved in holding the prey. This could indicate the prey was dragged over a long distance or alternatively was almost too large to move.



Drawing of *Thylacoleo* skull showing holding vice created by I1 & P3. Contact of upper teeth varies with movement of mandibles. Whilst pulling, the C, Pm^1 & Pm^2 and maybe the anterior edge of P^3 could all make contact.

In any case, it implies that Thylacoleo was able to transport a large carcase to the shelter of a cave. Assuming that such a carcase was relatively complete, a fact supported by the skull elements and sacral vertebrae found with the associated bones, it could have weighed in excess of 30 kg.

The noticeable absence of incisors 2 and 3 in all specimens collected may indicate they perform a particular function in a juvenile Thylacoleo, however, it is possible that these teeth are easily dislodged by the frantic movements of the prey being grasped. On the other hand, the continuing eruption of I1 in the juvenile reduces the alveoli of I2 and I3, which in itself may be sufficient to dislodge them.

With the mature animal many teeth exhibit some damage in the grasping area of the lower I1. This damage is in addition to and behind the notch caused by contact with the upper I1 from the opposite side during occlusion of the P3's.

Conclusions

1. The tooth marked bone adds further support to the theory that Thylacoleo was carnivorous (or had a lust for dragging dead wombats around!!!).

2. The functions of I1 and P3 also include being a well developed anchoring mechanism enabling quite large prey to be moved.

3. The degree of gouging indicates Thylacoleo was capable of travelling considerable distances in search of prey before dragging it back to a cave. The associated remains suggest the near complete wombat was devoured in a limited area and may not have been reduced in size greatly by desiccation to assist transportation.

4. Toothmarks at the break may indicate that Thylacoleo was capable of crushing a bone to disable its prey.

5. General lack of tooth marks on associated bones suggests that feeding may not produce frequent gashes on bones, and that the tooth marks on the femur may have resulted from the disabling killing and transportation of the prey.

6. It may not have been necessary to transport prey to a cave unless young were present. Many animals have been preserved in the cave sediments, but no such distinctive bone has been found before. General predation may have been much less demanding in regards to transport of prey. If pro-

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HYPOTHESISING ON A TOOTH-MARKED BONE (Cont.)

longed drought contributed to the "extinction" of Thylacoleo it may have been the browsing 'roos that suffered first, forcing the animal to alter diet.

The bone was collected in the extreme upper levels of the deposit which may indicate a fairly recent specimen. Perhaps the result of a last desperate bid to feed its litter. It is also of note that approximately 50% of Thylacoleo fossils are of very juvenile animals. The task of providing for them may have been too much in an extended drought.

NEW FOSSIL FISH FINDS IN QUEENSLAND

Last winter Greg Webb, an American graduate studying Palaeozoic corals at the University of Queensland, while doing field work in the Rockhampton district found the first specimens of bradyodont shark teeth to be discovered in Queensland this century. Only one previous specimen has been recorded from Queensland. This is the tooth which Etheridge jnr.,called Deltodus australis (in Jack & Etheridge 1892): a specimen which Charles Walter DeVis, then curator of the Queensland Museum also found in the Rockhampton district, during a field trip in 1887. At that time the limestones were consigned by Jack and Etheridge to the Gympie Series which was labelled as "Permo- Carboniferous", even though DeVis had considered his find Lower Carboniferous in age. Sadly, the type specimen of D. australis has not been seen since the production of the Jack and Etheridge volume - perhaps it was sent to the British Museum of Natural History in London where Etheridge worked while describing the fossils before he emigrated to Australia. Perhaps that is where it remains, although, it is possible that the specimen will come to light during the mammoth move of the Queensland Museum to its new home during this year.

Greg Webb's shark specimens also come from the Lower Carboniferous limestones west of Rockhampton, including the Lion Creek Limestone. The teeth belong to the bradyodonts called Helodus, Deltodus, Petalodus and Psammodus, types known mostly from teeth alone. These forms are being studied anew by workers in America and Australia after a gap of about 70 years. Even though keen amateur palaeontologists such as Amos Henry Worthen of Springfield, Illinois, and Orestes St.John, a student of Agassiz's at MCZ, Harvard, worked hard to describe and sort out these sorts of teeth in the last century, their pioneering

work has until recently been rather neglected. Now it is realised that sharks were undergoing a major radiation in the Early Carboniferous and that these fossils can give us useful stratigraphic information for this period. The new Rockhampton finds will help to relate the sharks of Australia with those of North America, Britain and Russia.

Another interesting new fish fauna is one found by geologist John F. Dear during borehole operations in the Tertiary oil shales of southeast Queensland. The core samples, about 50 mm diameter, pass neatly through sediments containing fossil fish representing at least three species. The fish are well preserved with large pigmented eyespots and remnants of otoliths. In the smallest form, possibly a fish of the herring family, the backbone is often curved away from the soft tissues, indicating that some drying out of the dead fish had occurred before burial. There are two types of fish with large dorsal, anal and tail fins (which are slightly larger than the 50 mm core), one of which exhibits beautiful cycloid scales.

A further fossil seems to be the polygonal dermal armour of a much larger form. This fauna will probably add to our knowledge of the Tertiary freshwater fish of Queensland as the bony fish have not been studied in detail since the formative work by E.Sherbon Hills (1934,1943) although Dr. Anne Kemp (Queensland Museum) has been working on the Tertiary lungfish. Dr.Lance Grande of the Field Museum of Natural History,Chicago, an expert on Tertiary fish faunas (e.g.,Grande 1984), is hoping to review the Queensland fossils.

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Susan Turner,
Queensland Museum
January, 1986.

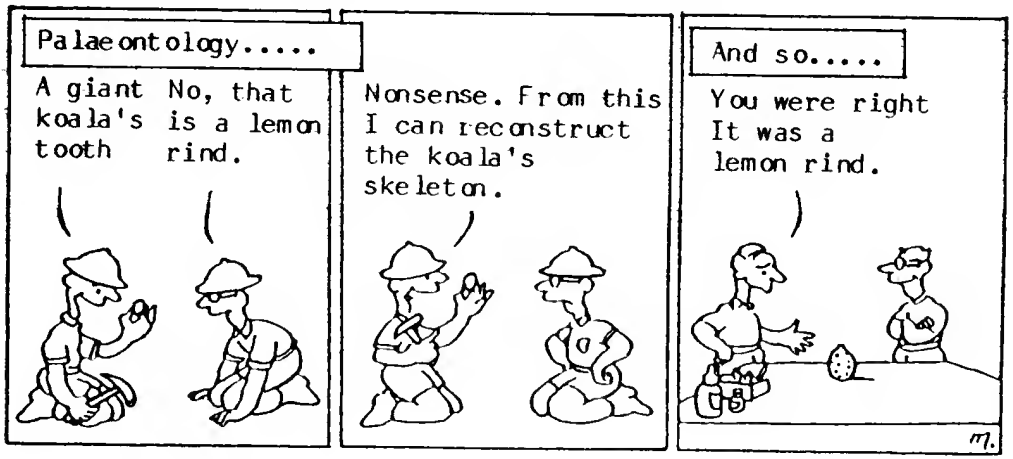
IN THE NEWS

A team of palaeontologists from Flinders University has unearthed the molar of a giant koala, more than 100,000 years old, in a cave at Naracoorte, South Australia.

The team's deputy leader, E.H. Bailey, believes the koala would have had difficulty climbing branches without breaking most of them. Remains of such a koala have previously been found on the Yorke Peninsula but this is the first discovery in the south-east.

Since the Victoria Cave was first explored in 1969, 78 different species have been discovered ranging from frogs to the large bull sized quadruped marsupial, Zygomaturus, even though only a tiny section has been excavated to date.

In the last 17 years two new species have been discovered; the huge python-like snake Wonambi naracoortensis Smith and the giant bush turkey Progura naracoortensis Van Tets.



Sydney Morning Herald, Wednesday 15th. January, 1986.

FIRST MARSUPIAL FOSSIL FROM ASIA

For a short while, the discovery of a fossil marsupial tooth from the lower most Oligocene (about 37 M.yr) of eastern Kazakhstan in central asiatic U.S.S.R. (Gabunia & Shevyreva 1985) reopened the question of a possible northern dispersal route for marsupial radiation between the Americas and Australia via Europe and Asia.

The currently accepted view is for a southern dispersal route from South America via Antarctica, a theory supported by the discovery nearly 4 years ago of a South American (polydolopid) marsupial in the Eocene (about 40 M.yr) deposits of Antarctica.

The single tooth from Russia has been identified as a first or second upper molar from the right side of the jaw and is very small, measuring only 1.7 mm long x 1.6 mm across.

Although this tooth may seem to provide support for the northern dispersal theory it is approximately equivalent in age to the oldest known Australian marsupial fossils from the late Oligocene* and so occurs too late to fit with the theory. Its closest affinities seem to be with the Opossum family Didelphidae, in particular the European fossil Opossums Amphiperatherium and Peratherium and the North American Herpetotherium. These forms have no particular Australian affinities and were most probably more widely distributed than had been thought before they died out without leaving any descendants in Europe, Africa or Asia.

Extract form "Nature" Vol. 318, 28th November, 1985.

* In Bulletin 18, page 3, we reported the find in Queensland of a 100 million year old vertebra considered to be from a marsupial mammal or a descendant of the group. This, if correctly identified really makes marsupial radiation difficult to explain on current evidence. The oldest known fossil marsupial in Australia(?), the second oldest known in North America and only younger remains in the supposed links, Antarctica and Asia.

One awaits with bated breath for the next marsupial discovery from around the world. ED.

S T O P P R E S S .

BAY FOSSILS FUEL CAR PARK REFUSAL

In the January 1986 Editorial we reported that commercial boating interests had submitted proposals to reclaim areas of Beaumaris Bay, approx. 21km S.S.E. of Melbourne, in the vicinity of the highly important fossil beds at the base of the Beaumaris cliffs.

We are happy to advise that "The Sun", Melbourne, carried a report on Friday 13th June, 1986, that the Minister for Planning & Environment, Mr Kennan, has rejected the development application because of the danger of damage to important fossil deposits on the foreshore. Mr Kennan stated that the site has been described as one of the most important geological sites in Victoria, the fossil material having thrown significant light on the origin and development of Australian vertebrate fauna. Among the fossils found at Beaumaris are bones of birds, whales, dolphins and two types of extinct giant marsupials.

GEOLOGY MUSEUM UNIVERSITY OF QUEENSLAND

The Geology Museum in the Department of Geology and Mineralogy, University of Queensland has a large collection of geological specimens on display including representative Australian fossil specimens from each period of earth history. The main display area is on the ground floor of the Steele Building at the St. Lucia campus.

This is currently the only comprehensive educational display, devoted entirely to geology in Queensland. There is a wealth of educational material for the individual visitor or groups.

The Museum produces a Newsletter designed to encourage interest in the earth sciences. Anyone interested in receiving copies on a regular basis (no charge) should write to the museum curator Mr. Andrew Simpson :-

Geology Museum,
Dept. Geology and Mineralogy,
University of Queensland,
St. Lucia, Queensland, 4067.

Visits to the museum can be arranged by 'phoning Mr. Simpson on (07) 3772668, during working hours.
